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10/581,060	05/30/2006	Masaharu Kawakubo	127873	6788
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/581,060	KAWAKUBO ET AL.	
	Examiner	Art Unit	
	Christina Riddle	2851	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 3/3/2009.

2a) This action is **FINAL**. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 31-35,37-44,46-52,54-57 and 59-62 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) Claim(s) _____ is/are allowed.

6) Claim(s) 31-35, 37-44, 46-52, 54-57, 59-62 is/are rejected.

7) Claim(s) _____ is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some * c) None of:

- Certified copies of the priority documents have been received.
- Certified copies of the priority documents have been received in Application No. _____.
- Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) Notice of References Cited (PTO-892)

2) Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.

4) Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.

5) Notice of Informal Patent Application

6) Other: _____.

DETAILED ACTION

Status

1. Acknowledgment is made of the amendment files on 3/03/2009 which amended claims 31, 32, 40, 41, 50, 52, 56, 61, and 62 and cancelled claims 36, 45, 53, and 58. Thus, claims 31-35, 37-44, 46-52, 54-57, and 59-62 are currently pending.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 31-35, 37-44, 46-52, 54-56, and 60- 62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kikuchi (US 2002/0042664 A1, using US 2004/0126004 A1 as a translation for the drawings) in view of Irie et al. (US Patent No. 5,525,808) and in view of Tomimatu (US Patent No. 6,338,925).

Regarding claims 31 and 61, Kikuchi teaches a first process in which estimate values of positional information used to align each of a plurality of divided areas on a photosensitive object with a predetermined point are calculated by a statistical computation, using actual measurement values of positional information of a plurality of

specific divided areas selected from said plurality of divided areas on said photosensitive object (Figure 5, step 310 and 320 as well as page 17, paragraph [185], and page 19, paragraph [209], divided areas on a photosensitive object are “shot areas”); and a second process in which with respect to a plurality of measurement divided areas on said photosensitive object including at least said plurality of specific divided areas, a non-linear component of positional deviation amount from an individual fiducial position (Figure 2, FM, reference mark or fiducial position is also inherent to and necessary for alignment) of each of said plurality of measurement divided areas is calculated respectively at predetermined intervals (see Figure 5, step 306 and page 19, paragraph [0208]), based on an actual measurement value of positional information of each of said plurality of measurement divided areas and on each of said estimate values (Figure 5, steps 314 and 318 and pages 19-20, paragraph [203]).

Kikuchi fails to teach that judgment is made about the necessity of update of correction information based on magnitude of one of said non-linear component of positional deviation amount calculated of each of said plurality of measurement divided areas and a variation amount of the non-linear component, said correction information being used to correct a non-linear component of positional deviation amount from an individual fiducial position of each of said plurality of divided areas on said photosensitive object.

However, Irie et al. teaches that judgment is made about the necessity of update of correction information based on magnitude of one of said non-linear component of positional deviation amount calculated of each of said plurality of measurement divided

areas and a variation amount of the non-linear component, said correction information being used to correct a non-linear component of positional deviation amount from an individual fiducial position of each of said plurality of divided areas on said photosensitive object (Figure 16A, steps 118 - 124 in which the nonlinear alignment errors are determined and the average error and standard deviation for all shots are determined. Based on the positional deviation amount and standard deviation, or variation amount, the judgment is made to update the correction information or calculation. Step 120 particularly shows a judgment or determination in the necessity to update correction information based on accuracy. Also see column 40, lines 59-62 and column 41, lines 9-28.).

It would have been obvious to one skilled in the art at the time of the invention to have included the capacity of judging of whether updated correction information is needed as taught by Irie et al. with the method of calculating positional information errors taught by Kikuchi since, as shown by Irie et al., a method of judging whether to update correction information is commonly done to improve throughput while ensuring accuracy in alignment (column 4, lines 56-61).

However, Kikuchi as modified by Irie et al. does not explicitly describe that said intervals are one of intervals of a predetermined number of said photosensitive objects and intervals of a predetermined period of time.

However, Tomimatu discloses intervals that are one of a predetermined number of said photosensitive objects and intervals of a predetermined period of time (Figure 3, step 22, Tomimatu teaches using a predetermined period of time T_s as predetermined

intervals and in column 4, lines 53-57, Tomimatu presents a sampling plan based on lot number, that is, a group of photosensitive objects).

It would have been obvious to one skilled in the art at the time of the invention to have included predetermined time-based intervals as taught by Tomimatu, with the predetermined intervals of performing the method of Kikuchi in view of Irie et al. since it is much more efficient to automate control of performing alignment calibration than to manually, and possibly needlessly, recalibrate every production lot.

Regarding claim 32, Kikuchi further teaches a third process in which an update processing to update said correction information is performed when it is judged that update is necessary in said second process (Figure 13, step 432 and see page 24, paragraph [282] line “second correction map” is updated in memory in place of the first correction map); and a fourth process in which exposure is performed controlling a position of said photosensitive object based on the estimate value of positional information of each of said plurality of divided areas and said correction information that is latest (Figure 13, step 440 and page 25, paragraph [290]).

Regarding claim 37, Kikuchi further discloses the method wherein as said plurality of measurement divided areas on said photosensitive object, only said plurality of specific divided areas can be designated (Figure 5, steps 306 and 320, specific divided areas are measured (8 shots under the normal EGA measurement method) and position coordinates are calculated for all areas).

Regarding claim 38, Kikuchi further teaches the method wherein as said plurality of measurement divided areas on said photosensitive object, at least a part of remaining divided areas can be designated in addition to said plurality of specific divided areas (Figure 5, steps 308 and 310, all specific divided areas are measured and position coordinates are calculated for all areas).

Regarding claim 39, Kikuchi further teaches that said correction information is one of a correction map and a correction function (Figure 9, step 340, and Figure 12, step 412).

Apparatus claim 50 is inherent to the method claim 31 and 32, and apparatus claim 54 is inherent to the combination of method claims 37 and 38 rejected above. Furthermore, apparatus claim 55 is inherent to the method of claim 39,

Device manufacturing claim 40 is inherent to the method claim 31 since an exposure method as described above would necessarily be performed either continuously (while one photosensitive object or substrate is exposed) or intermittently (a case in which one photosensitive object is exposed and subsequently another is exposed with an infinitesimal amount of time separating the two exposures). That is, any exposure apparatus performing the claimed method would necessarily be capable of performing the method at times as well as being in a non-exposing state at times in which the equipment is either preparing operation or just ending operation or in need of maintenance. Thus, the device manufacturing claim 40 is inherent to the method of exposure described above.

Regarding claim 33, Kikuchi does not disclose wherein in said third process, when the update processing of said correction information is performed, among said plurality of divided areas, at least a part of remaining divided areas excluding said plurality of measurement divided areas are to be new measurement divided areas, and said correction information is updated using a non-linear component of positional deviation amount from said individual fiducial position of each of said plurality of divided areas calculated based on actual measurement values of positional information of all measurement divided areas including the new measurement divided areas and on said estimate values.

However, Irie et al. further discloses that in said third process, when the update processing of said correction information is performed, among said plurality of divided areas, at least a part of remaining divided areas excluding said plurality of measurement divided areas are to be new measurement divided areas, and said correction information is updated using a non-linear component of positional deviation amount from said individual fiducial position of each of said plurality of divided areas calculated based on actual measurement values of positional information of all measurement divided areas including the new measurement divided areas and on said estimate values (Figures 17-18 and column 31, lines 8-25).

Regarding claim 34, Kikuchi does not disclose that said new measurement divided areas are determined based on evaluation results of said non-linear component of positional deviation amount of each of said plurality of divided areas included in said correction information before update.

However, Irie et al. further discloses that said new measurement divided areas are determined based on evaluation results of said non-linear component of positional deviation amount of each of said plurality of divided areas included in said correction information before update (column 31, lines 8-25, the accuracy of superposition in the alignment mode is calculated).

Regarding claim 35, Kikuchi does not disclose that said new measurement divided areas are determined based on evaluation results of one of said non-linear component of positional deviation amount of each of said plurality of measurement divided areas calculated in said second process and a variation amount of the non-linear component.

However, Irie et al. further teaches that said new measurement divided areas are determined based on evaluation results of one of said non-linear component of positional deviation amount of each of said plurality of measurement divided areas calculated in said second process and a variation amount of the non-linear component (column 31, lines 8-10 where $|X|$ is the positional deviation amount of each of said plurality of measurement divided areas calculated in the second process, and 3σ is the variation amount of the non-linear component).

Regarding claims 41 and 62, Kikuchi teaches a process in which estimate values of positional information used to align each of a plurality of divided areas on a photosensitive object with a predetermined point are calculated by a statistical computation, using actual measurement values of positional information of a plurality of specific divided areas selected from said plurality of divided areas on said

photosensitive object (Figure 5, step 310 and 320 as well as page 17, paragraph [185], and page 19, paragraph [209], divided areas on a photosensitive object are “shot areas”); a process in which with respect to a plurality of measurement divided areas on said photosensitive object including at least said plurality of specific divided areas, a non-linear component of positional deviation amount from an individual fiducial position of each of said plurality of measurement divided areas obtained from each actual measurement value of positional information and each of said estimate values is evaluated at predetermined intervals (Figure 5, steps 314 and 318 and pages 19-20, paragraph [203]). Kikuchi further teaches a process in which exposure is performed controlling a position of said photosensitive object based on the estimate value of positional information of each of said plurality of divided areas and said correction information after update (Figure 13, step 440 and page 25, paragraph [290]).

However, Kikuchi does not explicitly describe a process in which at least one of the number of new measurement divided areas to be added and an arrangement thereof is determined based on the evaluation results; and further a process in which correction information related to a non-linear component of positional deviation amount from an individual fiducial position of each of said plurality of divided areas on said photosensitive object is updated, using said non-linear component of positional deviation amount of each of said plurality of divided areas on said photosensitive object, said non-linear component of positional deviation amount being calculated based on actual measurement values of positional information of all measurement divided areas including said new measurement divided areas and on said estimate values.

Irie et al. teaches a process in which at least one of the number of new measurement divided areas to be added and an arrangement thereof is determined based on the evaluation results (column 31, lines 8-25 and lines 35-39, new shots are added when a desired accuracy is required and not satisfied based on the calculation of the accuracy. Further, an arrangement of the new shot areas is determined based on the addition of new shot areas.); and further a process in which correction information related to a non-linear component of positional deviation amount from an individual fiducial position of each of said plurality of divided areas on said photosensitive object is updated, using said non-linear component of positional deviation amount of each of said plurality of divided areas on said photosensitive object, said non-linear component of positional deviation amount being calculated based on actual measurement values of positional information of all measurement divided areas including said new measurement divided areas and on said estimate values (Figure 16A, steps 118 - 124 in which the non-linear alignment errors are determined and the average error and standard deviation for all shots are determined. Based on the positional deviation amount and standard deviation, or variation amount, the judgment is made to update the correction information or calculation—step 120. Also see column 40, lines 59-62 and column 41, lines 9-28.).

For claims 33-35, 41-44, 46-48, and 62 it would have been obvious to one skilled in the art at the time of the invention to have included the capacity of updating correction information with new measurement divided areas and said correction information is updated using non-linear components of position deviation amounts as shown by Irie et

al. with the method of calculating positional information errors of Kikuchi since, as shown by Irie et al., the addition of new measurement divided areas to update correction information is commonly done to improve throughput while ensuring accuracy in superposition during a variety of processing conditions while ensuring repeatability in alignment sensing (column 4, lines 61-67).

However, Kikuchi as modified by Irie et al. does not explicitly describe that said intervals are one of intervals of a predetermined number of said photosensitive objects and intervals of a predetermined period of time.

However, Tomimatu discloses intervals that are one of a predetermined number of said photosensitive objects and intervals of a predetermined period of time (Figure 3, step 22, Tomimatu teaches using a predetermined period of time T_s as predetermined intervals and in column 4, lines 53-57, Tomimatu presents a sampling plan based on lot number, that is, a group of photosensitive objects).

It would have been obvious to one skilled in the art at the time of the invention to have included predetermined time-based intervals as shown by Tomimatu, with the predetermined intervals of performing the method of Kikuchi in view of Irie et al. since it is much more efficient to automate control of performing alignment calibration than to manually, and possibly needlessly, recalibrate every production lot.

Regarding claim 42, Kikuchi further teaches the evaluation of said non-linear component of positional deviation amount of each of said plurality of measurement divided areas is performed, taking into consideration at least one of magnitude and a

dispersion degree of said non-linear component of positional deviation amount of each of said plurality of measurement divided areas in said correction information before update (page 17, paragraphs [189]-[190] and equation 8. The positional deviation amount vectors r_k include both the magnitude of deviation and dispersion degree—normally termed “direction”—of each respective shot area. The non-linear error of the wafer is composed of the non-linear error of the measured divided areas.).

Regarding claim 43, Kikuchi further teaches the evaluation of said non-linear component of positional deviation amount of each of said plurality of measurement divided areas is performed, using a predetermined evaluation function (page 17, paragraph [187] to compute the non-linear component of positional deviation amount of entire wafer, each positional deviation amount for all shot areas is taken into account.).

Regarding claim 44, Kikuchi further discloses that said plurality of divided areas on said photosensitive object are grouped into a plurality of blocks in advance, and the evaluation of said non-linear component of positional deviation amount of each of said plurality of measurement divided areas is performed with respect to each block (Figure 16, grouping the divided areas on the photosensitive object, or shot areas, before evaluating the non-linear error is an obvious variation of grouping the shots into a block after evaluating non-linear error).

Regarding claim 46, Kikuchi further teaches that as said plurality of measurement divided areas on said photosensitive object, only said plurality of specific divided areas can be designated (Figure 5, steps 306 through 320, specific divided

areas are measured (8 shots under the normal EGA measurement method) and position coordinates are calculated for all areas).

Regarding claim 47, Kikuchi further teaches that as said plurality of measurement divided areas on said photosensitive object, at least a part of remaining divided areas can be designated in addition to said plurality of specific divided areas (Figure 5, steps 308 and 310, all specific divided areas are measured and position coordinates are calculated for all areas).

Regarding claim 48, Kikuchi further teaches that said correction information is one of a correction map and a correction function (Figure 9, step 340, and Figure 12, step 412).

Apparatus claim 51 is inherent to method claim 33, and apparatus claim 52 is inherent to claim 35. Apparatus claim 56 is inherent to the method of claims 41 and 42, and apparatus claim 60 is inherent to the method claim 48. The apparatus claims 50-52, 54-56, and 60 are thus rejected as explained in the method claim rejections above.

Device manufacturing claim 49 is inherent to the method claim 41 since an exposure method as described above would necessarily be performed either continuously (while one photosensitive object or substrate is exposed) or intermittently (a case in which one photosensitive object is exposed and subsequently another is exposed with an infinitesimal amount of time separating the two exposures). That is, any exposure apparatus performing the claimed method would necessarily be capable of performing the method at times as well as being in a non-exposing state at times in which the equipment is either preparing operation or just ending operation or in need of

maintenance. Thus, the device manufacturing claim 49 is inherent to the method of exposure described above in claim 41.

4. Claims 44, 57, and 59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kikuchi as modified by Irie et al. in view of Tomimatu as applied to claim 41 above, and further in view of Umatate (US Patent No. 4,833,621).

Regarding claims 44, 57, and 59 Kikuchi as modified by Irie et al. in view of Tomimatu, as detailed in claim rejection 41 above, teach the evaluation of said non-linear component of positional deviation amount of each of said plurality of measurement divided areas is performed. However, Kikuchi in view of Irie et al. and in view of Tomimatu, in an alternate interpretation, does not disclose that the plurality of divided areas on said photosensitive object are grouped into a plurality of blocks in advance, and that the evaluation is performed with respect to each block.

However, Umatate does teach that the plurality of divided areas on said photosensitive object are grouped into a plurality of blocks in advance, and the evaluation of said non-linear component of positional deviation amount of each of said plurality of measurement divided areas is performed with respect to each block (column 2, lines 11-16, shots are grouped into blocks and then the blocks are aligned using several points in the block).

It would have been obvious to one skilled in the art at the time of the invention to have included grouping the plurality of divided areas into blocks in advance as taught by

Umatate, with the evaluation of non-linear components of positional deviation taught by Kikuchi as modified by Irie et al. and in view of Tomimatu since, as shown by Umatate, grouping a plurality of divided areas on a photosensitive object is commonly done to enhance throughput by evaluating and completing alignment operations before substrate processing commences (column 1, lines 47-50). It would have been an obvious extension of the teachings of Umatate to have applied the block alignment method to non-linear corrections as well.

The apparatus claim 57 is inherent to the method claim 44. The apparatus claim 59 is inherent from the methods of claims 44, 46, and 47. Thus, the apparatus claims are therefore rejected as explained above.

5. Claims 40 and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kikuchi as modified by Irie et al. in view of Tomimatu as applied to claims 31 and 41 respectively above, and further in view of Matsumoto et al. (US 2001/0034563 A1).

Regarding claims 40 and 49, Kikuchi as modified by Irie et al. and in view of Tomimatu, in an alternate interpretation, does not explicitly disclose a lithographic process wherein in said lithographic process, an exposure processing of a specific process is continuously or intermittently performed to each of a plurality of photosensitive objects using the above disclosed exposure method.

However, Matsumoto et al. teaches a lithographic process wherein in said lithographic process, an exposure processing of a specific process is continuously or intermittently performed to each of a plurality of photosensitive objects (Figure 3, a

processing apparatus, apparatus A or K for instance, is able to perform multiple processing conditions, or specific processes, such as conditions 21 and 13 for apparatus A or conditions 28 or 57 for apparatus K. This means that the particular apparatus must necessarily be either continuously or intermittently processing lots using either one processing condition in the continuous case, or both processing conditions in the intermittent case. Figure 28 shows the grouping of lots by similar processing type and Figure 31 further shows the decision of whether to continue processing one type of lot group or to process a different lot group type based upon a determined priority.)

It would have been obvious to one skilled in the art at the time of the invention to have included the exposure processing of a specific process is continuously or intermittently performed to each of a plurality of photosensitive objects as taught by Matsumoto et al., with the exposure method taught by Kikuchi as modified by Irie et al. and in view of Tomimatu since it is very well known in the art that alternately processing a mixture of processing conditions as shown by Matsumoto et al. is commonly done to improve throughput in a manufacturing environment in which individual equipment is used to perform multiple processing conditions.

Response to Arguments

6. Regarding the claim objections and the 35 U.S.C. 112 2nd paragraph rejection in the previous Action, Applicant's amended claims have fully addressed the objections. Thus the objections are being withdrawn by the Examiner.

7. Applicant's arguments filed 3/3/2009 regarding newly amended claims 31, 40, 50, 56, and 61-62 have been fully considered but they are not persuasive.

8. Applicant argues on page 16, lines 6-25, that there is no reason to combine Kikuchi and Tomimatu as proposed since "Tomimatu's intervals relate to intervals at which the photolithography system must be calibrated and relate to when calibration parameters are calculated. In contrast, Kikuchi's test of whether m is greater than or equal to n relates to when it is required to recalculate nonlinear components of arrangement deviations relating to shot area measurements of wafers." However, the examiner respectfully disagrees.

Though Kikuchi as modified by Irie discloses a method of calibrating a wafer's position to a stage position for proper positioning during patterning using an enhanced global alignment method (Kikuchi paras. [0005] and [0007]), the teachings of Kikuchi as modified by Irie does not explicitly disclose intervals that are one of a predetermined number of said photosensitive objects and intervals of a predetermined period of time. Thus, the teaching of Tomimatu was incorporated to disclose intervals that are one of a predetermined number of said photosensitive objects and intervals of a predetermined period of time (Figure 3, step 22, Tomimatu teaches using a predetermined period of time T_s as predetermined intervals and in column 4, lines 48-57, Tomimatu presents a sampling plan based on lot number, that is, a group of photosensitive objects as well as based on a period of time. Thus, if a predetermined number of lots or a predetermined period of time passes, a particular process is then performed). While the examiner

notes that Tomimatu does disclose further steps in the calibration procedure, the language of the claims is met since the claims are not limited to that which is recited.

Since both Kikuchi as modified by Irie and Tomimatu relate to automated calibration systems for photolithography equipment, it would have been obvious to have included time-based intervals as taught by Tomimatu, with the predetermined intervals of performing the method taught by Kikuchi as modified by Irie et al. since it is much more efficient to automate control of performing alignment calibration than to manually, and possibly needlessly, recalibrate every production lot. Thus, the invention as claimed would be rendered obvious by the combination. The Examiner further notes that for each of Kikuchi, Irie, and Tomimatu, intervals based on time and lots processed are interchangeable during normal operation of the taught methods, because during normal operation of photolithographic equipment the equipment is continuously fed with uniform lots of substrates. Thus an interval based on numbers of lots is equivalent and convertible to a time-based interval by multiplying the time spent per substrate by the number of substrates in a lot, further multiplied by the number of lots in the interval, and vice-versa.

Thus, Applicant's arguments are not found to be persuasive.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Kawakubo et al. (US Patent No. 5,654,553) discloses adjusting an imaging feature each time a predetermined time period has elapsed when a predetermined number of substrates are treated.

Nishi (US Patent No. 6,198,527) discloses measuring a baseline every time a predetermined number of wafers are replaced, and thus at predetermined time intervals.

Taniguchi (US Patent No. 6,710,848) discloses measuring a baseline at predetermined time intervals.

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christina Riddle whose telephone number is (571)270-7538. The examiner can normally be reached on Monday- Thursday 7:00-17:30 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diane Lee can be reached on (571)272-2399. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/C. R./
Examiner, Art Unit 2851

/Diane I Lee/
Supervisory Patent Examiner, Art Unit 2851